

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) An electric charge transfer apparatus, comprising:

a plurality of vertical charge transfer devices, each of which is formed adjacent to a photoelectric conversion element and transfers a signal electric charge converted by the photoelectric conversion element;

a plurality of charge-discharging circuit sets formed next to each vertical transfer device, each charge-discharging circuit set including at least two charge-discharging circuits connected in a serial manner for discharging the signal electric charge transferred by at least one of adjacent vertical transfer devices; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.
2. (Withdrawn) An electric charge transfer apparatus according to claim 1, wherein

said vertical charge transfer devices are configured in parallel to each other; and

a charge-discharging direction of at least one of the charge-discharging circuits formed next to each vertical transfer device is an opposite direction of a charge-discharging direction of other charge-discharging circuits formed next to the same vertical transfer device.
3. (Withdrawn) An electric charge transfer apparatus according to claim 1, wherein

said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device.

4. (Withdrawn) An electric charge transfer apparatus according to claim 3, wherein a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.
5. (Withdrawn) An electric charge transfer apparatus according to claim 1, wherein said charge-discharging circuit comprises a control gate that controls discharging of electric charge independently from other charge-discharging circuit corresponding to the same vertical charge transfer device.
6. (Currently Amended) A solid-state imaging device, comprising:
- a semiconductor substrate;
 - a plurality of photoelectric conversion elements formed on said semiconductor substrate;
 - a plurality of vertical charge transfer devices formed above said semiconductor substrate, each of which is formed adjacent to each of the photoelectric conversion element and transfers transfer signal electric charge photoelectric converted by the said photoelectric conversion element elements;
 - a plurality of charge-discharging circuit sets formed next to each vertical transfer device, each charge-discharging circuit set including at least two charge-discharging circuits connected in a serial manner for discharging the signal electric charge converted by the photoelectric conversion element at a predetermined position and transferred by at least one of adjacent vertical transfer devices; and
 - an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to outside.

7. (Withdrawn) An electric charge transfer apparatus according to claim 6, wherein said vertical charge transfer devices are configured in parallel to each other; and a charge-discharging direction of at least one of the charge-discharging circuits formed next to each vertical transfer device is an opposite direction of a charge-discharging direction of other charge-discharging circuits formed next to the same vertical transfer device.

8. (Withdrawn) An electric charge transfer apparatus according to claim 6, wherein said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit correspond to the same vertical charge transfer device.

9. (Withdrawn) An electric charge transfer apparatus according to claim 8, wherein a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

10. (Withdrawn) An electric charge transfer apparatus according to claim 6, wherein said charge-discharging circuit comprises a control gate that controls discharging of electric charge independently from other charge-discharging circuit corresponding to the same vertical charge transfer device.

11. (Withdrawn) An electric charge transfer apparatus, comprising:
a plurality of vertical charge transfer devices, each of which has plural lines of charge transfer electrodes and transfers signal electric charge;
a plurality of charge-discharging circuits arranged to each line of the charge transfer electrodes, each of the charge-discharging circuit selectively discharging the

signal electric charge transferred by the vertical charge device to a discharging direction different from other charge-discharging circuit; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.

12. (Withdrawn) An electric charge transfer apparatus according to claim 11, wherein said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device, and

a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

13. (Withdrawn) A solid-state imaging device, comprising:

a semiconductor substrate;

a plurality of photoelectric conversion elements formed on said semiconductor substrate;

a plurality of vertical charge transfer device formed above said semiconductor substrate, which transfer signal electric charge photoelectric converted by said photoelectric conversion elements;

a plurality of charge-discharging circuits arranged to each line of the charge transfer electrodes, each of the charge-discharging circuit selectively discharging the signal electric charge converted by the photoelectric conversion element at a predetermined position and transferred by the vertical charge transfer device to a discharging direction different from other charge-discharging circuit; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.

14. (Withdrawn) An electric charge transfer apparatus according to claim 13, wherein said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device, and

a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

15. (Previously Presented) An electric charge transfer apparatus according to claim 1, further comprising a horizontal charge transfer device formed at the lower end of the vertical charge transfer devices and connected at one end thereof with the output circuit.

16. (Previously Presented) An electric charge transfer apparatus according to claim 15, wherein the horizontal charge transfer device receives the signal electric charge in parallel from the plurality of vertical charge transfer circuits and transfers the received signal electric charge in sequence to the output circuit.

17. (Previously Presented) An electric charge transfer apparatus according to claim 1, wherein a first of the at least two charge-discharging circuits selectively discharge the signal electric charge from the plurality of vertical charge transfer devices.

18. (Previously Presented) An electric charge transfer apparatus according to claim 17, wherein a second of the at least two charge-discharging circuits discharges the signal electric charge left after the discharging of the first charge-discharging circuit.